

NOTES ON THE ANATOMY OF THE AUSTRALIAN VOLUTES, *BEDNALLI* and *GROSSI*

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(Plate 1, Text figures 1-2.)

I have recently had an opportunity, through the kindness of Colonel Alvin R. Cahn of Tokyo, Japan, and Miss Elizabeth M. Wistar of Chestnut Hill, Pennsylvania, of examining the soft parts of two rare volutes from Australia. This is not an attempt to define or revise the very confusing genera and subgenera of northern Australian volutes. We provisionally place *Cymbiola bednalli* and *C. grossi* in the subgenus *Volutoconus* Crosse, 1871. We use *Cymbiola* Swainson, 1831 (tautotype: *cymbiola* Sowerby, 1825, ex Chemnitz, vol. 10, figs. 1385-1386 = *cymbiola* Gmelin, 1791) in the same broad sense as does Wenz, 1943, pt. 6, p. 1334, who includes *Aulica* Gray, 1847, *Aulicina* Rovereto, 1899, *Callipara* Gray, 1855, and *Volutoconus* Crosse, 1871, as subgenera. We do not follow the very confused revision by Pilsbry and Olsson, 1954.

CYMBIOLA (VOLUTOCONUS) *BEDNALLI* Brazier

(Plate 1, fig. 3; text fig. 1)

1879 *Voluta bednalli* Brazier, *Proc. Linn. Soc., N.S.W.*, Vol 3, p. 81, pl. 8, fig. 3 (Port Darwin, Australia); 1894, Sowerby, *Proc. Malac. Soc., London*, Vol. 1, p. 49; 1880, Angas, *Proc. Zool. Soc., London*, for 1880, p. 418, pl. 40, fig. 1 (in colour); Allan, *Australian Shells*, Melbourne, plate opposite p. 224, fig. 1 (in colour).

Our five live-collected *C. bednalli* (ANSP No. 210685) were obtained by Dr. T. Ino off Darwin, North-West Australia, 6th August, 1957, in 23 to 25 fathoms. The bottom is a mud-sand mixture, and *bednalli* lives buried in the bottom with only the tip of the spire projecting above the surface. Live specimens are uncommon.

As indicated by our synonymy, *bednalli* has been adequately figured and described. When fresh, the colour markings on the shell are dark chestnut-brown, but in dead specimens this fades to a light chestnut. In one of our specimens, the body whorl bears 10 long, low, indistinct, axial plications at the periphery. The large, rounded nucleus in all five specimens consists of $3\frac{1}{2}$ whorls, the summit bearing a very small, dark brown spur. This is followed by one smooth, glossy, brown whorl, following which the next $2\frac{1}{2}$ whorls bear numerous low, tiny, axial riblets. There is a minutely raised spiral thread just below the well-impressed suture. The nuclear whorls are yellowish white in colour, with a narrow, irregular brown band just above the suture.

Animal.—The soft parts are typically volutid, rather closely resembling those of *Cymbiola* (*Aulicina*) *vespertillo* Linne in general structure, but without any distinctive colour pattern. The soft parts preserved in alcohol

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were pinkish in colour. The head is proportionately much smaller than that in *Voluta musica* Linne. Tentacles moderately long and thin. Siphonal appendages short, the left one being only slightly larger than the right. The interior of the rhynchostome is heavily beset with small cartilagenous papillae. Operculum absent.

The odontophore from a shell 103 mm. in length is about 5 mm. in length, narrow, strong, and with 43 rows of strong, uniserial teeth, whose bases are closely set together, so that the cusps overlap two teeth in front. The tooth has a moderate, thick base, a very large, narrow, arching central cusp. On each side is a lateral cusp, which is one-third as large, thinner and narrower. The central cusp is triangular in cross-section.

Remarks: Until the animal of the type species of *Volutoconus* is known (*V. coniformis* Cox 1871, *J. Conchyliol.*, 19, p. 74, pl. 4, fig. 1, Nichol Bay, Western Australia), there will be some doubt as to the wisdom of placing *bednalli* or *grossi* in that subgenus, although on conchological grounds it seems reasonable. The radulae and nuclear shell characters of *bednalli* and *grossi* are quite similar to each other.

CYMBIOLA (VOLUTOCONUS) GROSSI Iredale.

(Plate 1, Figs. 1, 2, 5; Text fig. 2.)

1927 *Amoria grossi* Iredale, *Aust. Zool.*, Vol. 4, p. 336, pl. 46, fig. 2 (Caloundra).

Description: Adult shell 98 to 116 mm. ($3\frac{3}{4}$ to $4\frac{1}{2}$ inches) in length, solid, elongate, glossy, and salmon-red in colour. Whorls 6 to 7, slightly shouldered, unevenly descending to give the spire a "lop-sided" appearance. Nuclear whorl about $1\frac{1}{2}$, very small, rapidly descending, with slightly concave sides, alabaster white, and raised into a sharp, spine-like projection. Following two post-nuclear whorls bulbous, evenly rounded, regularly descending, weakly malleated, especially the uppermost one, with a dozen microscopic spiral threads, and coloured a bright orange-tan. There is a fine, white spiral line just below the minutely impressed suture. The last $2\frac{1}{2}$ whorls increase their rate of descent, are slightly concave below the suture, and gently swollen at the periphery. Spiral sculpture absent; axial sculpture of numerous, uneven, fine lines of growth, and generally with one or two scars from formerly damaged lips. Ground colour of body whorls yellowish or bluish white, over which is a heavy diffusion of spreading reticulations and mottlings of light carmine red. There are three or four indistinct narrow bands of red showing on the outside of the last whorl. Interior of aperture whitish rose. Outer lip sharp, slightly thickened and slightly compressed at the middle. Columellar plaits well developed, strongly slanting, squarish in cross-section, glossy white with a taint of pink, and the uppermost being the largest. Above the latter there may be a small, swollen, white, button-like callus. Parietal wall sometimes weakly glazed with "melted brown sugar" material. Siphonal fasciole deep, U-shaped, its scar leading back to the second plait from the top. Operculum wanting.

Measurements (mm.)—

Length of Shell	Length of Spire	Width	
115.5	38.0	38.5	ANSP No. 225313
110.3	32.4	36.8	A. J. Ostheimer, 3rd.
111.5	30.0	34.6	John duPont Coll'n
98.2	27.5	33.7	ANSP No. 225313
(118	not given	48	Holotype, fide Iredale, 1927)

Type locality.—Caloundra, north end of Moreton Bay, 60 miles north of Brisbane, Queensland, Australia. Dead shell collected about 1903 by Mr. George Gross.

Additional records.—Miss Elizabeth M. Wistar of Chestnut Hill, Pennsylvania, presented two of the above specimens to the Academy of Natural Sciences of Philadelphia. They and several others were obtained by an Australian correspondent from shrimp trawlers operating in about 33 fathoms, a few miles south-east of Fraser Island, Wide Bay, Queensland. This is about 70 miles north of the type locality.

Animal.—Unfortunately, only one shell (98.2 mm. in length) contained a rotted, dried animal, from which only the odontophore was recovered. The latter consists of a strong, narrow, small ribbon 4.5 mm. in length, with about 35 rows of strong uniserial, tri-cuspid teeth. Their bases are placed close to each other, so that the long cusps overlap the next two teeth. The base is sturdy, thick, and gives rise at the centre to a strong, narrow, arching, central cusp. On each side there is a lateral cusp of about half the size of the middle one.

Remarks.—This rare species was originally described by Iredale as an *Amoria* Gray 1855. However, the Y-shaped, uniserial teeth of *Amoria* bear only a single central cusp, and the nucleus of the shell does not bear a small, spine-like projection. *C. grossi* is now placed in the subgenus *Volutoconus* with some reservation. This is done because of the resemblance of the radula, nucleus and columellar plicae to those of *bednalli*.

A fourth species, *hargreavesi* Angas, in all likelihood belongs to *Volutoconus*, although I have not seen specimens. It was described without locality data (*Proc. Zool. Soc.*, London, for (1872), p. 613, pl. 42, fig. 13), although it possibly comes from Queensland or New Caledonia. *C. (V.) hargreavesi* resembles *grossi* in colour and general shape, but is considerably broader and has three columellar folds, the upper two being large and almost at right angles to the axis, much as in *bednalli*. From Angas' figure, the apex appears to be obtuse like that in *bednalli*.

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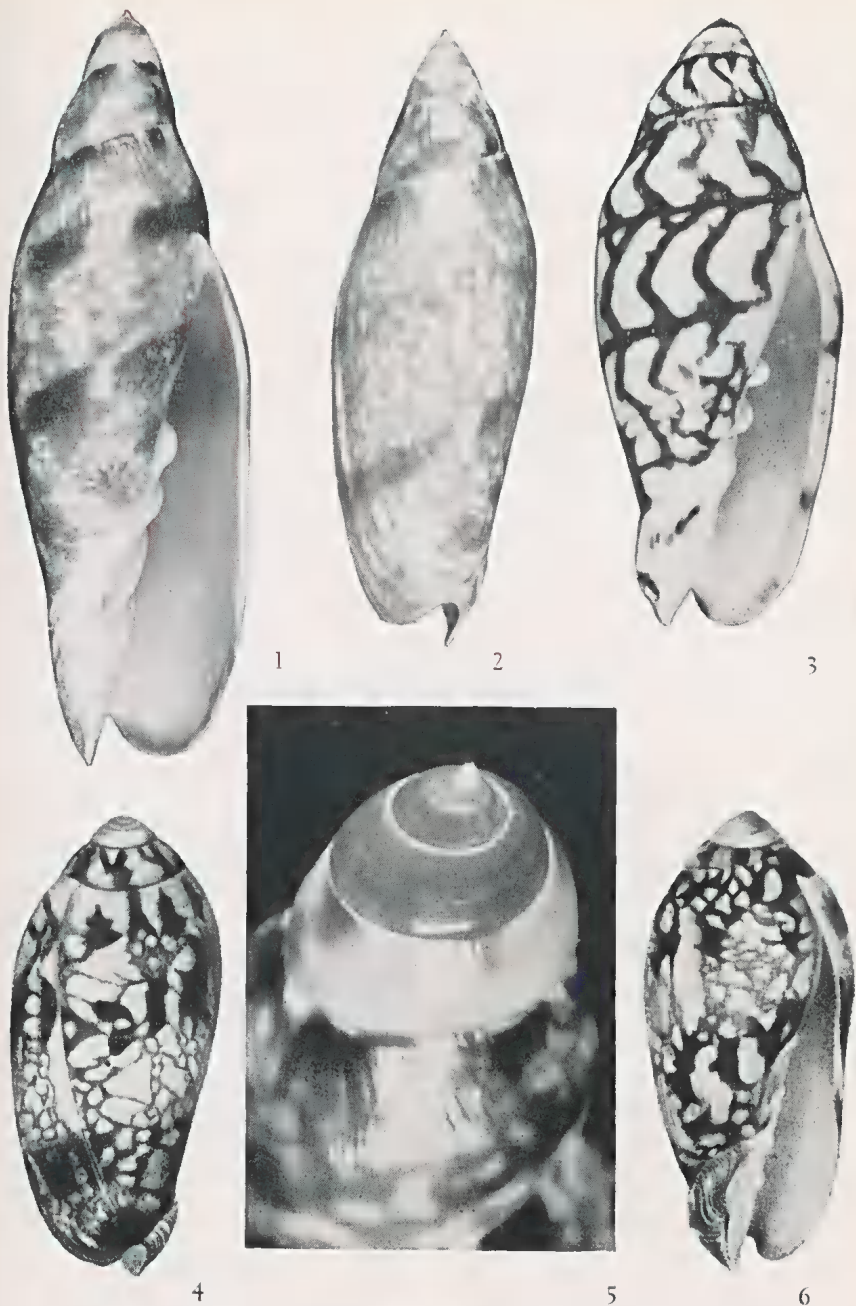
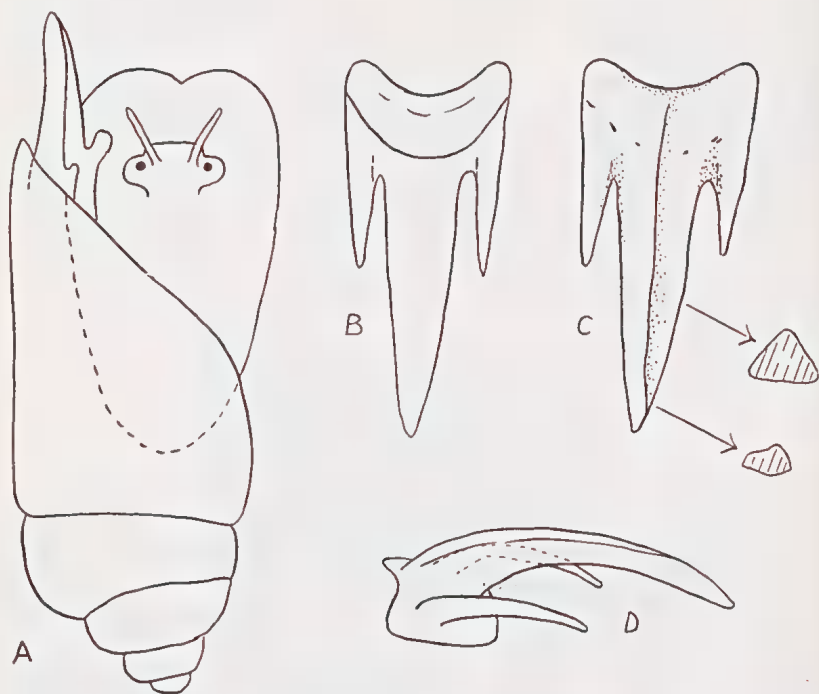


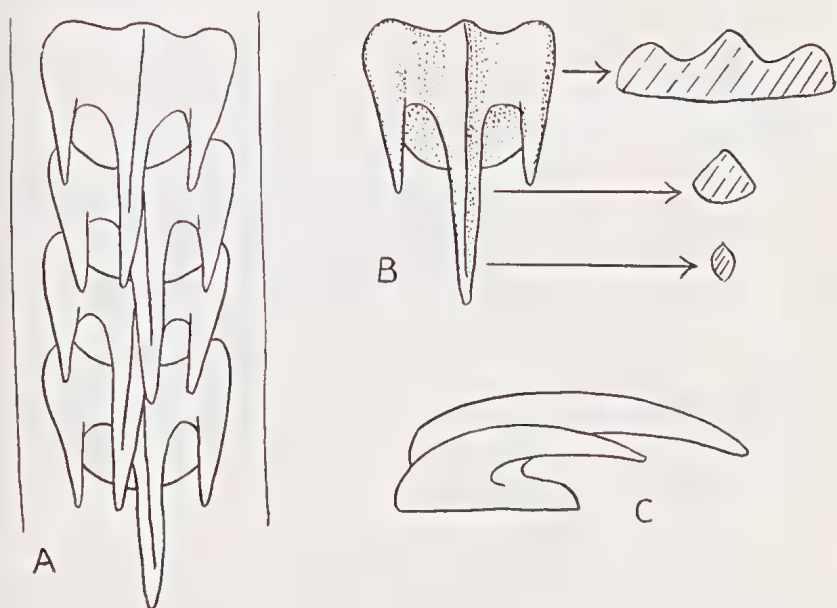
Plate 1.

Plate 1. Figs. 1 and 2, *Cymbiola (Volutocoenus) grossi* Iredale (A.N.S.P. No. 225313); 3, *Cymbiola (Volutocoenus) bednalli* Brazier (A.N.S.P. No. 210685); 4 and 6, *Cymbiola (Volutocoenus) coniformis* Cox (from the *J. Conchylol.*, Vol. 19, pl. 4); 5, apical view of *C. (V.) grossi* Iredale (fig. 5 magnified X 10, others slightly reduced).



Text Figure 1.

Text fig. 1. *Cymbiola (Volutoconus) bednalli* Brazier. A, dorsal view of soft parts (preserved animal), showing siphon at the left with its two siphonal appendages, the head, foot and visceral mass; B, attachment side of rachidian tooth; C, dorsal view of rachidian tooth showing two cross-sections; D, three-quarter side view of rachidian tooth. (fig. A reduced $\frac{1}{2}$, radula X 100).



Text Fig. 2.

Text fig. 2. *Cymbiola (Volutoconus) grossi* Iredale. A, dorsal view of odontophore showing alternating arrangement of teeth; B, dorsal view of rachidian showing three cross-sections; C, side view of rachidian tooth. (X 100).